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T H E

EDINBURGH

SMOKE-DOCTOR.

CONTAINING

PART I. An exact Method of carrying up Vents in New Buildings, to prevent Smoke, with Observations upon the Errors of the Vents in Old Buildings, by way of Introduction.

PART II. The Causes of Smoke in Old and New Buildings, especially in and about EDINBURGH.

PART III. A Description of several Machines for the Tops of Chimneys, to prevent Smoke.

The whole illustrated and explained with Copper-plate Cuts.

Carmichael and Brownlie

By A. C. and J. B. MASONS.

EDINBURGH:

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M,DCC,LVII.

To the Honourable
GEORGE DRUMMOND Esq;

One of his Majesty's Commissioners of Excise at *Edinburgh*.

THE ROYAL INFIRMARY, and the ROYAL EXCHANGE, together with the other great Schemes you have contrived for beautifying and improving this Capitol, are such Monuments and Proofs of your public Spirit, and Zeal for the Good of your Country, as justify the Choice this City hath so often made of you for their Chief Magistrate*; likewise encourage every Citizen to hope, that he shall have your Patronage in every thing he attempts for the Public Good.

'Tis thus we are encouraged to dedicate this little Performance of ours to you. The Design of which is to improve a Branch of Masonry, which, tho' of great Importance, has been much neglected. We would fain
hope,

* He has been four times Lord Provost of *Edinburgh*.

hope, that what we have said on this Subject will be of some Use. And we humbly intreat, that your Honour, who was lately at the Head of the honourable and antient Fraternity of Free Mafons*, will indulge two Brethren in their Desire to have your Name prefixed to their Work.

We beg leave to assure you, that we join heartily with all Lovers of Masonry and their Country, in praying that your useful Life may be lengthened out, so as that you may live to see these Public Works, for adorning this City, to which you have already given such a happy Beginning, carried into Execution. We are,

Honoured Sir,

With all due Respect,

Your most obedient

and obliged humble Servants,

ALEX. CARMICHAEL.

JOHN BROWNLIE.

* He was Grand Master of Scotland in the year 1753.

T H E
P R E F A C E.

AS SMOKE is a great Grievance to the Eyes of Ladies and Gentlemen, and likewise spoils and abuses the Furniture in any Room, but much more especially the fine Linens, Lawns, or Cambricks, as well as Silks, which Ladies do wear: So our Authors being to use their utmost Skill and Endeavour to cure Smoke, they hope that they will not be carped at by Critics, for the Want of a nice and fluent Style of Language; such Fluency of Discourse, and Elegancy of Style, cannot reasonably be expected from them, as they are Mechanics, and intend to observe Plainness in their Delivery of the following Directions to prevent Smoke,

Yet, after all, if any shall be found so critical (notwithstanding our Authors their ingenuous Confession) to carp at their Way of Delivery, and
show

show their Spleen thereby, let such remember, that tho' they cannot cure them of that Spleen so raised (which they do not undertake to perform) yet, perhaps, they may cure them of a far more dangerous Spleen, occasioned by the Effects of, and Provocation given by Smoke (which they do undertake to perform.)

As for Gentlemen and Ladies of Worth and Merit, upon whose Goodness our Authors rely, and are well assured, that the Cure of Smoke being performed by them, they shall have their Approbation.

Mechanics, who shall have occasion to follow these Directions, we hope, will find them answer the Design to their Employers, as well as their own Satisfaction.

There are a great many of our Brethren who understand the Cures of smoky Vents; but, as none of them have thought proper to publish Directions thereanent, this has induced us, amongst other

P R E F A C E. vii

other Reasons, to exhibite this Treatise to the Public. Amongst those of our Brethren Mechanics, who undertake the Cure of smoky Vents, there are some who being Strangers in this City, cannot possibly form any Right Notion of our Vents here in this City, and do more frequently mistake than cure, whatever Pretensions they may make.

Those then of our Brethren, and those only, who having long been employed in and about this City of Edinburgh, are the surest Doctors of smoky Vents: The Situation of Edinburgh with its lofty Buildings being so precarious, that he who understands the Cures of its Vents from Smoke, may cure smoky Vents any where else.

As we have made it our endeavour to observe Plainness, so as much as possible we have studied Brevity: Intending thereby, that as Gentlemen should not be made impatient to know the Meaning of any Machine herein described, or other Directions herein given, by the Tediousness or
Obscurity

Obscurity of the Descriptions thereof ; so likewise that Gentlemen's Time of Business might not be interrupted by the perusal hereof, but rather that they might read it in a few leisure Hours, at their own proper Conveniency.

Farewell. A. C. J. B.

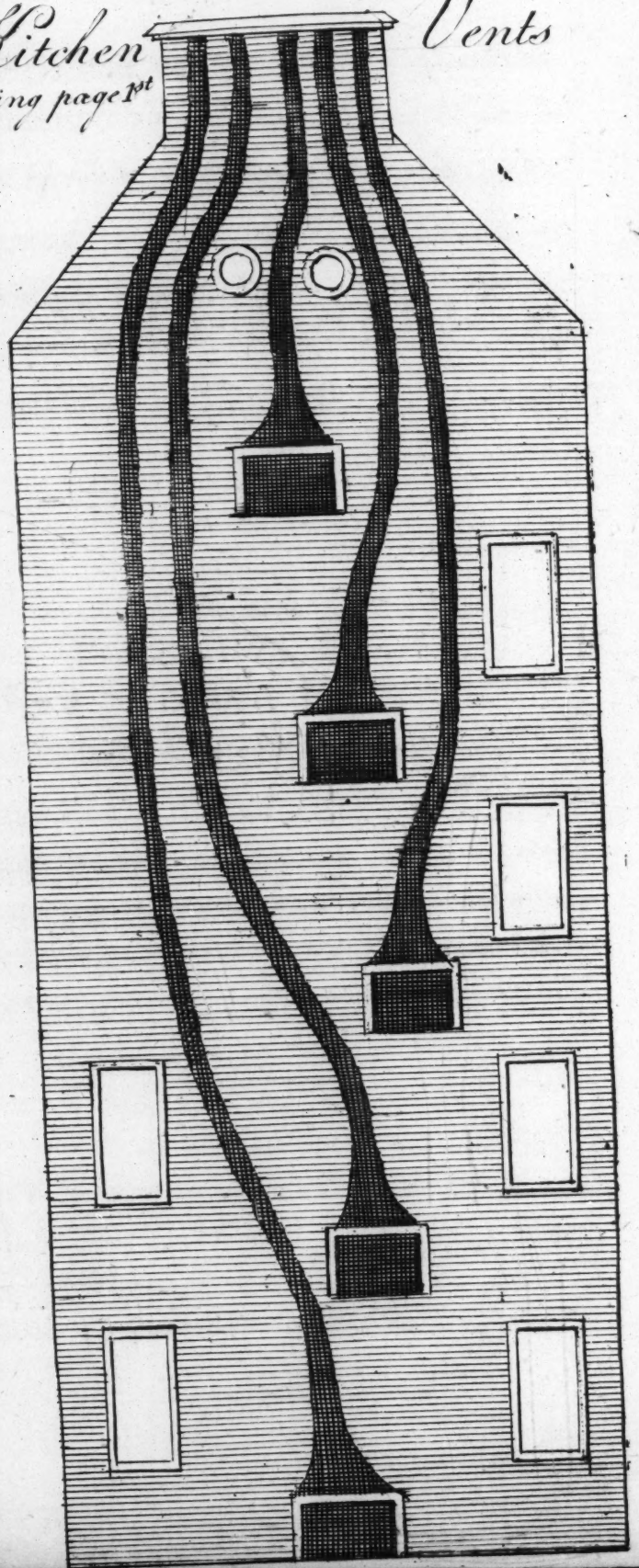
A D V E R T I S E M E N T.

AALEXANDER CARMICHAEL and JOHN BROWNLIE continue to carry on their Employment of curing smoky Vents, as usual, to the general Satisfaction of Gentlemen and Ladies who have employed them, both in Town and Country.



Kitchen
fronting pagest

Vents



THE
EDINBURGH
SMOKE-DOCTOR.

PART I.

An exact method of carrying up Vents in new Buildings to prevent Smoke, with Observations upon the Errors of the Vents in old Buildings, by way of Introduction.

AS our intention in this Treatise is chiefly to cure Smoky Vents, we hope it will not be improper, by way of Introduction, to give a general scheme of building and carrying up Vents; which, when wrong performed, occasion Smoke, and are, as errors in the first concoction, not easily cured.

As there are different degrees of Vents, we shall distinguish them by the usual names of Kitchen-Vent, Bed-chamber Vent, and large Dining-room or Gallery Vent. The right founding of all

A

which

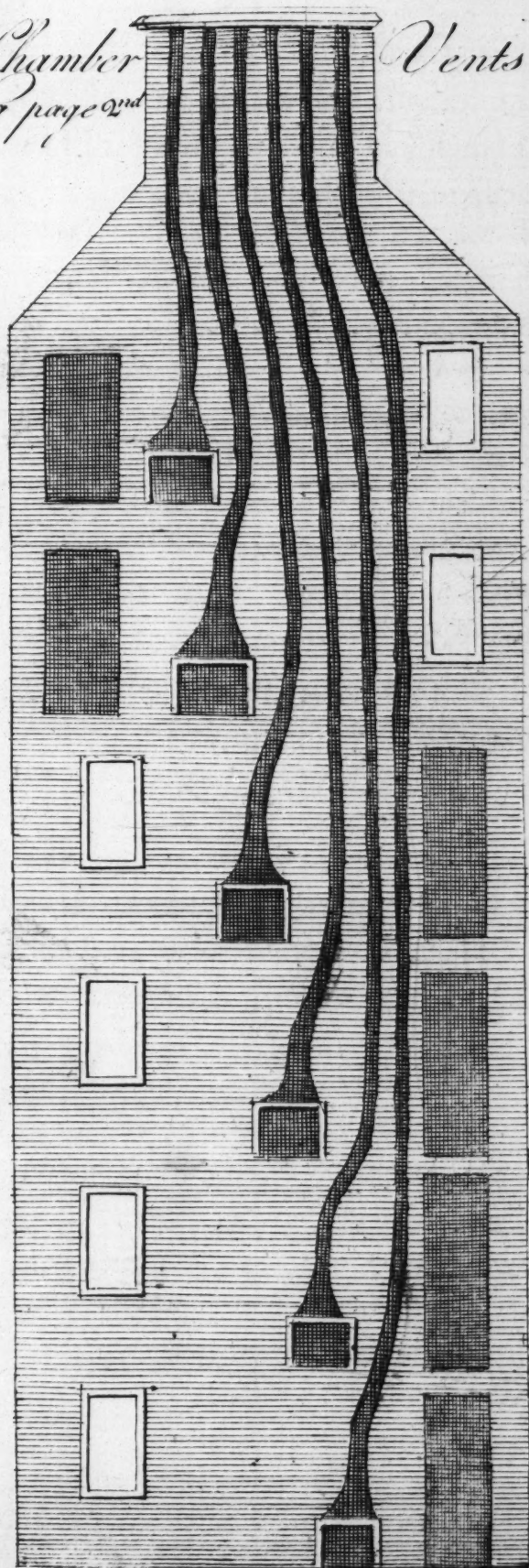
which we leave to the option of the Mason or Architect employed therein; and shall here begin from the top of the Chimney-piece.

FIRST then, as to the Kitchen-Vent. Bring on your oncoming side from the top of your jambs, where-ever you are designed to land next story, with a little rounding above the jamb; likeways the flying side must be brought forward rounding all the way, to meet the oncoming side about a yard above the lintel, the proper distance being 15 inches square. Then fall back with your flying side till you recover your oncoming side with a gradual turn, not too sudden, and from that place where you recover to the level of your side-walls; the proper distance is 13 inches square. Next, from the level of your side-walls to the height or top of your Vent one foot or 11 inches square is the proper distance, always remembering to carry on your Vent gradually from the larger distance towards the lesser, as above directed.

SECONDLY, The Bed-room or Chamber Vent. Two feet above the lintel you must make your oncoming side and flying side meet within 12 inches square, rounding all the way from the level of the jambs, and from thence upwards about 10. Confine it gradually to 11 or 10 inches square: From
thence

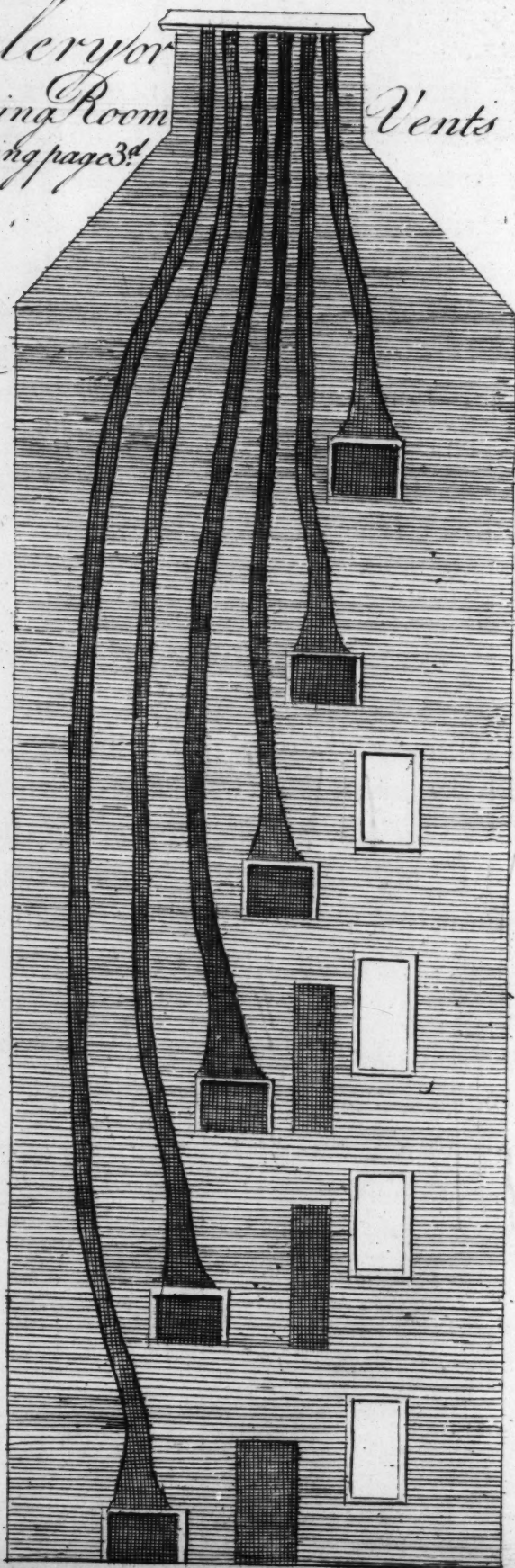
Bed Chamber
Fronting page 2nd

Vents



*Galery for
Dinning Room
Fronting page 3^d*

Vents



thence carry it at the same distance to the level of your side-walls, if you go 6, or 7, or perhaps fewer stories high : Thence to the top of your Vent bring it gradually in to 8 inches square, with your turns always gradual if possible, and your backs always plumb if not falling back.

N. B. It is many times very difficult for the Master Mason to observe these proportions in this city ; because, while the Building is going on according to the first plan, the Master Builder or Employer (some new notion or other coming in his mind, such as a window, or press-room, or some other conveniency) causeth an alteration of the first plan, and harms or marris the Mason very much in his scheme or design : Likeways the Master Builder or Employer is apt to reflect upon the Mason afterwards, whereas he himself is to blame. Our advice therefore is, either not to alter the first plan, or else take the advice of the Mason anent the alteration ; but it is better not to alter it at all.

THIRDLY, Large Dining-room or Gallery Vents. You must bring on the oncoming side and flying side about a yard above the lintel to 14 inches square, rounding from the top of the jambs to the above mentioned height : From that height carry it up 9 feet gradually, confining the above distance to 12 inches square : And from thence to what-
ever

ever height you go to the top of your Vent. Finish it at 9 inches square, always observing to carry the back of your Vent plumb (if not falling back) and your turns as gradual as possible.

LASTLY, Garret Vents or upper stories. Their proportions are much the same with Bed chamber Vents; only we must observe, that they are commonly built or carried up too streight or perpendicular, and in old Buildings especially, where the Vents are generally too wide at the top, so as the day-light shines down upon the grate below, which makes them the worst going Vents in the whole land or building. Our advice therefore in that case is, that in new Buildings you keep back your other Vents on each side of the side-wall or gavel to give room on any side to carry up your Vent in a curved line till you cover the whole of your Chimney-piece below; at least so far as to hinder the day-light from shining down the Vent: For when a gradual turn is made, it gives the Smoke more strength to go forward. Whereas when the Vent is carried streight upwards or perpendicular, the shortness of the draught causeth always a flan of wind on the top.

P A R T II.

*The Causes of Smoke in old and new Buildings,
especially in and about Edinburgh.*

IN old buildings, as we are many times employed to stop and contract the Vents to the forementioned proportions, which oftentimes causeth trouble and expence, so we judge it our duty to inform the public, as well as young Mechanics in town or country, how to prevent the like for the future.

FIRST, The Vents in old buildings occasion Smoke when they are too wide built, which they commonly are; and we having our rooms generally pretty clos, the suction below has not sufficient force to drive up the Smoke, especially if there be the smallest fan of wind on the top; whereas when the Vents are carried up according to the foregoing proportions, or contracted and brought in to the same proportions, the suction below becomes stronger, and drives the Smoke up with force notwithstanding of a fan of wind on the top.

SECONDLY,

SECONDLY, In common Vents where the sides are parallel, which is commonly the case in old buildings, the Smoke easily spreads into the corners, and the least agitation throws it into the room.

1st, Because when it is in these corners it is less pushed upwards, as being no longer over the fire, or directly above the fire.

2^{dly}, Because the air from the room striking with more force upon the middle of the Chimney where the heat is, it becomes more extended by rarefaction, and pushing the Smoke still against the corners of the Chimney makes it recoil and go back into the room.

3^{dly}, If the air be driven forcibly into the Chimney, as it happens when a window or door is open, that air driving the Smoke violently against the back of the Chimney, it will whirl about in the corners, especially if a wind at the same time blows down the Vent.

Therefore parabolical hanches or sides, and a Vent carried up whose wings are bent in curved lines, will take off these last mentioned inconveniencies: For first, you take off the corners where the Smoke used to stagnate, and then come back into the chamber: Next, this confines all the Smoke over the fire, which drives it upwards with force, and so it has more power to resist the
air

air at the top of the Vent: Lastly, the air of the room presses against the Smoke, whilst it is over the fire, and so drives it all at once up the Vent.

THIRDLY, Air hinders Smoke from coming out. The external air above the Vent hinders the Smoke from coming out at the top.

1st, When it is too thick for the Smoke to break thro' it.

2^{dly}, When the Chimney is commanded, tho' the weather be very calm, and the air clear.

FOURTHLY, The winds not only hinder the Smoke from coming out, but beats it back into the top of the Vent, where they also blow down sometimes with such violence as to drive the ashes and coals about the room.

1st, Wind hinders the Smoke from coming out, when Chimneys are commanded on any side; as when they are near any great building, near a steeple, a tower, an higher house, or the side of a mountain; or perhaps in the country, near to woods, &c. they are apt to smoke, tho' the wind is scarce sensible; especially when it comes from the side opposite to that which commands them, because the many stops that it meets with make it rest at the top of the Vent, and even drive

drive into it by its increased spring, naturally going towards that place where it is least opposed.

2dly, When the winds are violent, this inconveniency is greater; because such winds not only hinder the Smoke from going out, but make it go back with violence; for the air in the Chimney, whatever wind blows, is always more rarified than the outward air: Likewise, when the wind blows very fast, and has a great degree of velocity, if its horizontal direction makes it slide over the top of a Vent, it is because it meets with nothing in its way; but, if it meet with a rub, or any obstruction beyond the Chimney, the rarefaction of the air in the Chimney under it, lessens or takes off from the push upwards against the Smoke; and by consequence gives it a pressure downwards.

3dly, When a Chimney is near enough to the place that commands it, and the wind is strong, it may be apt to smoke, tho' the wind blows from that part where it is commanded; because the opposition that the wind meets with, increases the spring of the air, and, making it to be condensed in that place, as soon as it is passed over the obstacle, it pushes downward into the Chimney, where it meets with least resistance.

4thly, Tho' a Vent is not commanded, the wind may blow into it, especially if its hole be a parallelogram, and the wind runs along its longest sides; and indeed, in any position of the hole, a North wind

wind, which commonly blows downward, may beat into it.

FIFTHLY, Too wide a hole at the top of the Vent causeth Smoke.

1st, Because the wind may easily blow into it then, being too wide and disproportioned to the distance or wideness below.

2dly, Because, as the parts of the air move every way, the resistance that they meet with on any one side, diminishes the spaces between them, and so both condenses the air, and increases its spring; then, as in the former case, the Smoke cannot so easily divide the air to get up thro' it.

B

PART

P A R T III.

*A Description of several Machines for the Tops
of Chimneys, to prevent Smoke.*

BEFORE we enter upon this description, it is proper we should give some reasons for the necessity and usefulness of such Machines, in cases where the Smoke cannot be cured in the ordinary way, either in old or new buildings.

Having formerly shown, that the structure of old Vents, as they are generally built, causeth Smoke, and that the best method to prevent Smoke is by the new structure, or by contracting the old Vents to the proportions of the new structure : We have likewise given some hints of the causes of Smoke in general, even where Vents are most exactly carried up according to this new method. Here we would observe, more particularly, the situation of this City, with its lofty buildings, is so precarious and irregular, with respect to the free passage of Smoke, that some Vents will smoke, be they ever so exactly built : For which many reasons may be given ; especially those mentioned in Part II. When this is the case, they cannot be
cured

cured without Machines on the top, suited to the different causes of the Smoke, or situation of the Vent.

Even the very Castle of this City, tho' it stands high, some Vents in it do smoke to such a degree, that they are obliged to use Machines on the tops of some of the highest of them: Tho' indeed our opinion of these Vents in the Castle, is, That they either are not built agreeable to just proportions, or else they are stifling Vents; for we cannot comprehend what should make them smoke, as their situation is so clear, and free of every obstacle, that we think no flane could affect them, unless it comes from some neighbouring hill, which we will not account for.

As to the City, the case is very different; for, besides the tops of some high buildings commanding the Vents of lower buildings, the Southerly winds, *viz.* the winds that blow from the South-east and South-west quarters of the Compass, do most affect the Vents on the South of the City; and the Northerly winds, *viz.* the winds blowing from the North-east and North-west quarters, do most affect the Vents on the North side of this City. Likewise in Summer, as the sun is high in his course, so the winds are generally high, and do not occasion such smart flans as in the Winter; when, as the sun is low, so are the winds low also, and much more violent than in Summer, which is the
cause

cause that Vents are more troubled with flans in Winter than in Summer.

MACHINE I. PLATE I. FIG. 1.

The DESCRIPTION.

This Machine is made of white or black iron; the main body of it is made round, the wideness of it is proportioned to the wideness of the Vent, as the main body of all Machines are, with this difference, that, if the main body be square, it must be exactly the wideness of the Vent whereon it is fixed; but, if the main body be round, you must allow it to be 2 or 3 inches more diameter than the wideness of the Vent where it is placed, whether it be Kitchen, Dining-room, or Bed-chamber.

Make the square-piece that goes down the Vent 9 or 10 inches deep.

The main body of this Machine being round, make it 2 or 3 inches more diameter than the Vent, as above mentioned; because the Machine being round, unless you allow the circumference thereof somewhat wider than the Vent it is fixed upon, when there is much Smoke, and the Kitchen or room below clogs, it causeth a stifling; which

which is many times an error of the Smith's, who makes these Machines too narrow.

Let the main body be 3 or 4 feet high, as the situation of the Vent requires: There are two axletrees that hold the upright spindle, which axletrees, the lowermost must be fixed within the body of the Machine half a foot down, and as small as possible; the uppermost axletree must be fixed upon two supporters, 4 inches above the top of the main body of the Machine, with an hole exactly in the middle of each axletree, to set the spindle into, with an iron wedge thro' the spindle, immediately above the upper axletree, to allow the top-piece of the Machine to be taken off, when the Vent is to be swept; the spindle must be 24 inches high above the top of the main body, and the thean must be about 8 inches by 10.

The top-piece is formed with two wings, archways, and the middle almost a semicircle; it must hang over the main body about 6 or 7 inches below the top thereof, and 12 or 14 inches above the main body.

This Machine is very useful to prevent flans of wind making impresson on Smoke, especially where it is not interrupted with clois buildings, and, if right made, scarce ever fails to have the desired effect; but, where it meets with eddie-winds, it makes it take swift turns, which sometimes occasions a small flan, but is presently over.

EX-

EXPLANATION. PLATE II. FIG. I.

Draw the two parallel lines AB and CD, representing the main body of this Machine ; then BC is the top of the body ; the prickt line *ef* shows the lowermost axletree, 6 inches within the main body ; and the line *gb* shews the uppermost axletree, 4 inches above the top of the body ; the two lines B*g* and C*b*, are the supporters of the upper axletree, 4 inches high from the top of the main body ; MN represents the spindle of the head-piece ; and the figure T represents the thean ; the arches OP represent the body of the head-piece, or back or middle of the head-piece ; and the two arches QR and SV represent its wings on each side ; the two prickt lines A*p* and D*q*, shew the square-piece of this Machine, that goes down the Vent to fix it with, being commonly 9 or 10 inches deep.

MACHINE II. PLATE I. FIG. 2.

The DESCRIPTION.

This Machine may be made of white iron, wood, or in brick-work ; if you make it in brick-work, raise it about 3 or 4 feet high, the main body above

bove the cope of the Vent ; then place 4 pan-tyles on end, upon each angle of the Vent, with their round side towards the inside of the Vent, as plumb as possible, and make up your ports betwixt them about 3 or 4 inches ; only notice the port towards that point of the Compass from whence the flan comes, that causeth the Vent to smoke, make it up to the top of the tyles.

Likewise you must make two squinted holes opposite to each other in the main body, about a foot below your tyles, to give force to drive off the flan ; make these holes about 6 inches square in wideness, and the same in length. The main body of this Machine must always be square ; and, whether you make it of wood or iron, observe the same directions : As to its wideness, it is proportioned to the Vent whereon it is built, if in brick-work, and whereon it is placed, if in wood or iron, allowing a square-piece to go down the Vent 9 or 10 inches, to fix it withal.

EXPLANATION. PLATE II. FIG. 2.

Draw the two lines AB and CD, representing the main body of the Machine ; the line BC shews the top of the main body ; the curved lines Bg and Cb, represent the two pan-tyles on two corners of the top of the main body ; and the figure Bg b C represents the other two pan-tyles on the
other

other two corners ; MN and LK represent the two squinted holes.

The two prickt lines *Ap* and *Dq*, shew the square-piece of the Machine, that goes down the Vent to fix it.

MACHINE III. PLATE I. FIG. 3.

The DESCRIPTION.

The main body of this Machine is made of wood or white iron, either round or square, and its wideness proportioned to the wideness of the Vent it is to be fixed upon ; make the main body 4 or 5 feet high above the cope of the Vent.

Make the box round the top of the main body always square, one foot above the top of the main body ; make this box clost all round, and on the top, with a square hole in the middle of the top, and a lid or cover for the hole, with iron bands to lift up the lid, when the Chimney is to be swept ; this box must be made of wood ; likewise you must make this box or head-piece half a foot on each side wider than the Vent (if the neighbouring Vents will allow it) that the Smoke may have room to come out downwards round the sides of the main body, as it cannot get upwards and cure the flan. As to the deepness of the box, make it
2 feet

2 feet and a half, *viz.* 1 foot above the main body, and 1 foot and an half below the top of the main body ; likewise you must make two squinted holes, about 6 or 7 inches square, and the same in length, about 2 feet below the top of the main body.

EXPLANATION. PLATE II. FIG. 3.

Draw the lines AB and CD, representing the main body of the Machine ; the prickt line BC shews the top of the main body within the box or head-piece ; the lines *fg* and *hi* are the depth of the outsides of the head-piece ; and the line *gPæb* is the top of the head-piece ; and the figure *Pæ* shews the lid that opens to sweep the Vent ; MN and LK represent the squinted holes opposite each to other in the main body.

MACHINE IV. PLATE I. FIG. 4.

The DESCRIPTION.

This Machine is made of wood or white iron ; the wideness of the Vent is the rule for the wideness of the main body, which must alwise be square, and about 3 or 4 feet high, besides what is fixed within the Vent, *viz.* 9 or 10 inches ; the head-

C

piece

piece must be square also, and the same wideness with the main body, and three times the wideness of the main body in length ; that is, one third immediately above the main body, and one third on each side projecting out from the main body. This head-piece is clos'd above, with an hole in the middle, having a lid with iron bands to lift, when the Chimney is to be swept ; likewise the ends of the head piece must be open, with squinted broads on the mouths of the two ports ; also you must make two squinted holes in the main body, about six inches square in wideness, and 18 inches below the head-piece : This Machine must be placed with its broad side towards that quarter from whence the flan comes ; and likewise upon Vents where the head-piece will not incommode the neighbouring Vents, with its projecting ends hanging over the mouths of these Vents.

EXPLANATION. PLATE II. FIG. 4.

Draw the lines AB and CD, representing the main body ; the parallel lines *g B C d* and *q p*, shew the cross head-piece ; and the lines *g b* and *q b* shew the squinted broads on one end of the head-piece ; the lines *d b* and *p b* shew the squinted broads on the other end of the head-piece. The figure L shews the lid to lift open the top of the head-piece ; and MN and LK shew the squinted holes at each side of the main body.

MA-

MACHINE V. PLATE I. FIG. 5.

The DESCRIPTION.

This Machine is generally made of white iron, and is always round. The main body must be 2 or 3 inches diameter wider than the mouth or top of the Vent upon which it is placed, and about 3 or 4 feet high: Likeways allow a square piece about 9 inches deep to fix it within the Vent. You must make 4 squinted holes in the main body parallel to one another, and about 6 or 7 inches below the head-piece, and 6 inches square in wideness. The undermost part of the head-piece must be 9 inches below the top of the main body, projecting downward, and 4 inches diameter wider than the main body, with its upper hole 6 inches diameter; and 3 supporters from the main body, and within the head-piece, which supporters are also fixed to the upper part of the head-piece. Likeways the lower end of the upper part of the head-piece must be 9 inches diameter, hanging 2 inches over the under part of the head-piece, and 7 inches high, with its upper hole 4 inches diameter quite open. This head-piece resembles 2 milk fythes overturned, and the one a-top of the other.

EX.

EXPLANATION. PLATE II. FIG. 5.

Draw the lines AB and CD representing the main body of this Machine; the prickt line BC is the top of the main body; LK and *nm* shew the squinted holes; the two arches *f* and *e* shew the under part of the head-piece; and the two arches *g* and *b* represent the upper part of the head-piece; the three prickt lines *pq*, *st*, and *ro*, shew the supporters fixed on the top of the main body and bearing up the head-piece, and R shews the hole at the top.

MACHINE VI. PLATE III. FIG. I.

The DESCRIPTION.

This Machine is done in brick-work with flags or flat stones on the top. Carry up your building with bricks 4 or 5 feet high, especially if it be upon an old Vent, and the Vent wider than the proportions described in Part I. of this book. Bring it gradually narrow to the top; then place two flat stones on edge with their broad sides towards those quarters from whence the flans come which cause the Vent to smoke. Lay them closs together at the top, allowing a little hole in the middle to sweep the Vent. Let the stones be about 14 inches high and 18 or 20 inches long, but the one no longer than the other, to prevent the

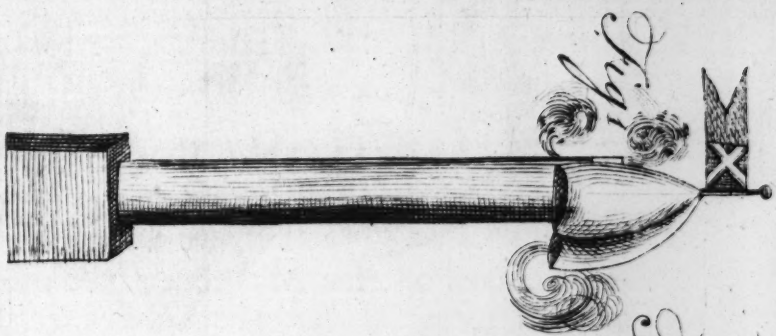


Fig 1

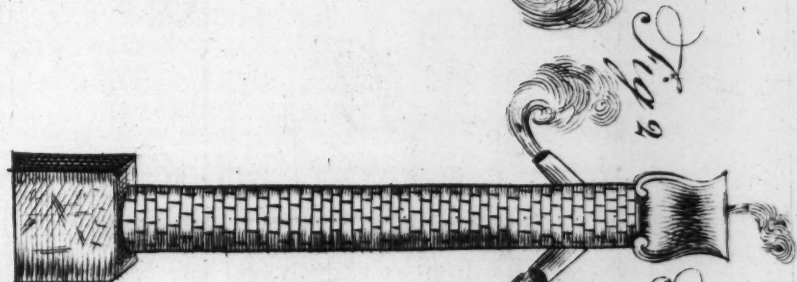


Fig 2

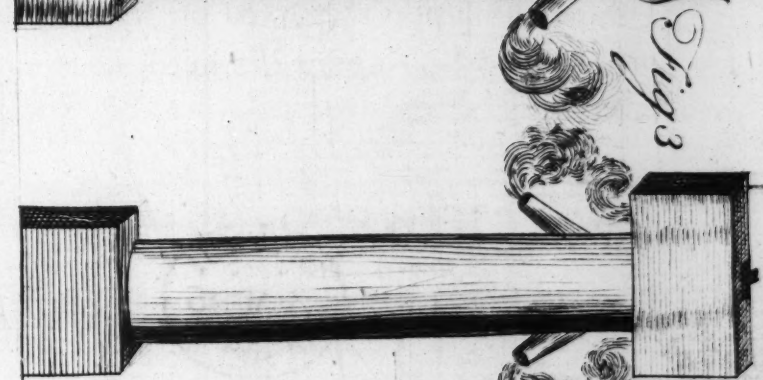


Fig 3

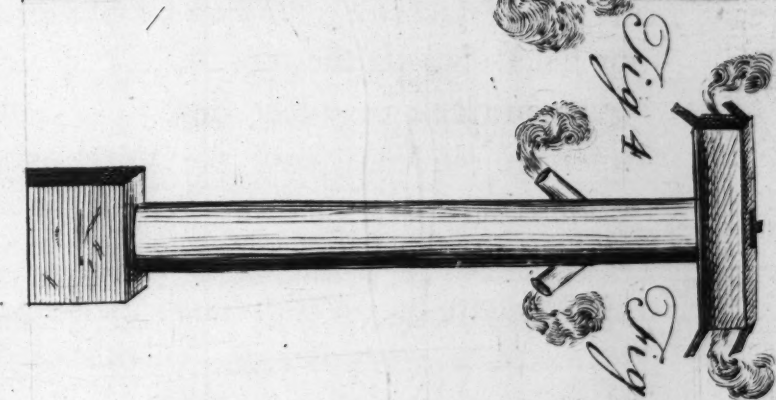


Fig 4

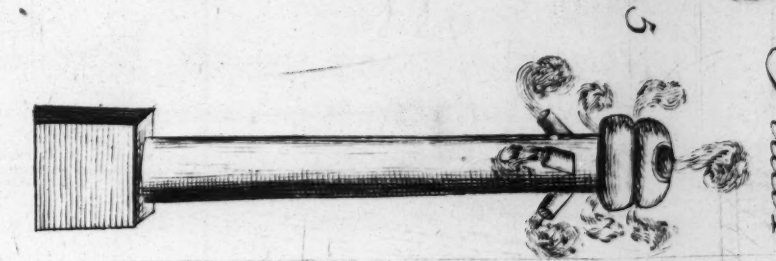


Fig 5

Plate 1





Fig 1

A
D
P
Q

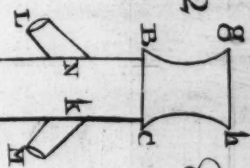


Fig 2

A
D
P
Q

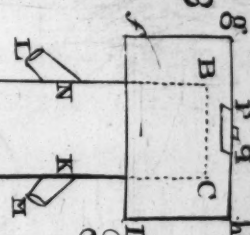


Fig 3

A
D
P
Q

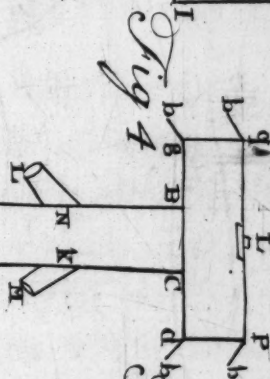


Fig 4

A
D
P
Q



Fig 5

A
D
P
Q

Plate II



the flan from having an opportunity to take the port, and beat back the Smoke. Also you must make 4 squinted holes for air to drive up the Smoke; each of them about 6 inches square in wideness, and the same length. Two of these holes must be placed one foot below the flags, and the undermost 2 one foot below the uppermost.

EXPLANATION. PLATE IV. FIG. I.

Draw the lines AB and CD representing the main body; BC is the top of the main body; the figures *k* and *k*, and *p* and *p* shew the squinted holes on each side of the main body: also BF and FC represent the two flags on the top.

MACHINE VII. PLATE III. FIG. 2.

The DESCRIPTION.

This Machine is made of white iron or in brick-work. If you make it of white iron, the main body is round; if of brick-work, the main body is square. And if you place it upon an upper story or garret Vent, where the draught is short, raise 6 or 7 feet high with bricks; or if in white iron, make it about 3 or 4 feet high: And if the Vent be wide whereon you perform it with bricks, you must contract it gradually narrower towards the top to the proportions described in Part I. before you place your top-piece.

piece. Likeways, if in white iron, you must make the Machine gradually narrower towards the top, if the Vent be too wide. As for the head-piece, take 4 pan-tyles (if the main body be done in brick-work); place them on end with the round side inwards toward the Vent as plumb as possible: Then take two thin flags and lay over the tops of each two of the tyles, 6 inches broad the flags, and no longer than cover your tyles: Then above these place other two thin flags on edge, laying them clost together at the top. If you make the main body of white iron, observe the same directions with its plates as to the head-piece. As to the ports between the tyles, observe the same directions as in Machine II. and the same as to the cutting the plates of white iron for the head-piece, always placing the highest made up port towards that quarter from whence the flan comes that causeth Smoke.

EXPLANATION. PLATE IV. FIG. 2.

Draw the lines AB and CD representing the main body; BC is the top of the main body; the curved lines BD and *ce* describe the pan-tyles on two opposite corners; and the figure *BdfgeC* describes the other two pan-tyles on the other opposite corners; the lines *df* and *ge* shew the flags that cover the tyles; and the lines *fb* and *bg* represent the flags on edge above the other flags.

MA-

MACHINE VIII. PLATE III. FIG. 3.

The DESCRIPTION.

The body of this Machine is commonly done in brick-work, raised about 3 or 4 feet high to bring the Vent to a right proportion; and the head-piece must be made of wood or white iron.

This Machine is chiefly designed for Vents where two gavels are so near to other as 18 inches, the distance ordered by act of Parliament for an easing drop, and the one gavel a great deal higher than the other.

You must so fix your head-piece as to ly towards the other highest gavel, as in the figure, and make it clos in three sides next to the gavel, and the under side half a foot free of the wall to catch the flan, and receive the Smoke, and prevent it from returning back into the Vent. You must make an hole in the under side about 6 or 7 inches square, to help to throw out the body of Smoke. The wideness of this head-piece is proportioned to the wideness of the main body at the top thereof, and its length according to the distance of the gavels or side-walls, with a square hole and a lid with iron bands to lift up above the hole in the under side, to allow the Vent to be swept.

EX.

EXPLANATION. PLATE IV. FIG. 3.

Draw the lines AB and CD representing the main body of this Machine; BC is the top of the main body; *ef* shews the lid to lift up on the top of the head-piece or upper part of it; and *gb* shews the open hole in the under part of the head-piece; the figure *Befkmgbc* represents the whole head-piece, of which *k* and *m* are the extremities.

MACHINE IX. PLATE III. FIG. 4.

The DESCRIPTION.

This Machine may be made altogether of white iron or of wood, or the main body of wood with an head-piece of white iron. Likeways you may make the main body in brick-work with an head-piece of white iron or wood, or an earthen pot or cann cast into the proper dimensions. If you make it of white iron, the body may be round; but if in brick-work or wood, the body must be square.

To perform in bricks you must raise your main body 3 or 4 feet high with two holes six inches square squinted downwards, at 8 inches distance
below

below your head-piece; observing to place your holes on the sides where your Vent is least touched with any flans of wind. The head-piece must be 2 feet high and 6 inches diameter at the top; and the under part of the head-piece or top of the main body 8 inches square, this Machine being fittest for small or narrow Vents, such as bed-chambers or garret-rooms, &c.

EXPLANATION. PLATE IV. FIG. 4.

Draw the lines AB and CD representing the main body; *f* and *g* represent the squinted holes in each side of the main body; the line BC shews the top of the main body; and the figure BbkC represents the head-piece or earthen pot or cann.

MACHINE X. PLATE III. FIG. 5.

The DESCRIPTION.

This Machine is performed by placing two thin flags on edge one foot high on the top of any cope or Vent head: Then cover them with another thin flag with an hole in the top about 4 inches diameter, and two open ports. When this is performed make up one of the ports quite clos,

D

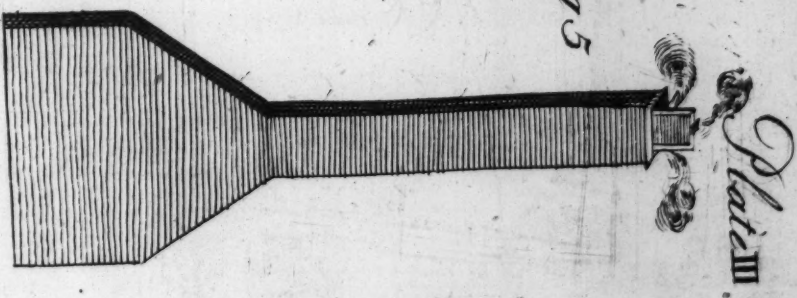
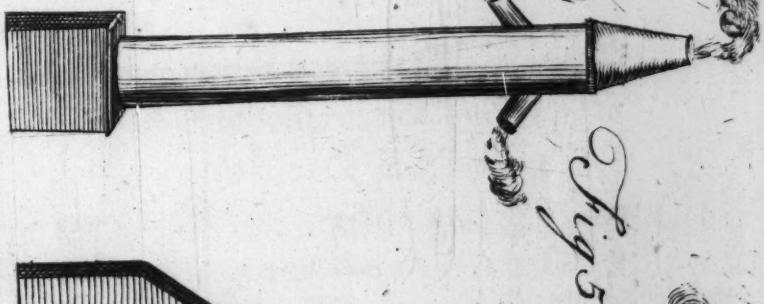
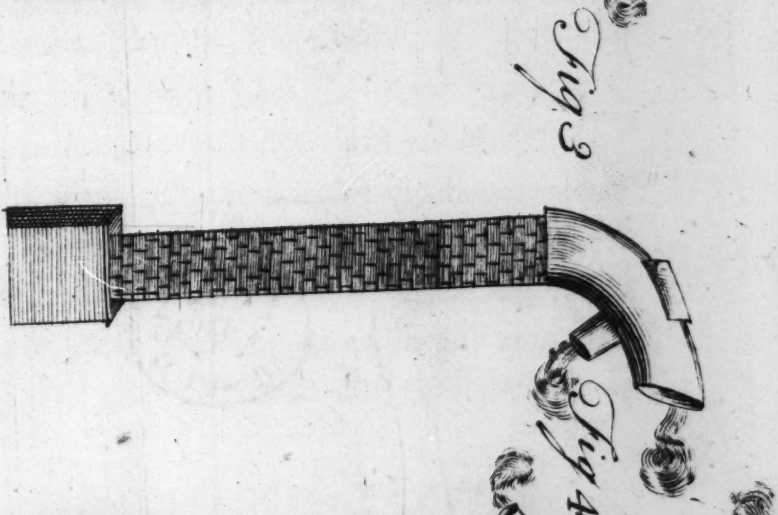
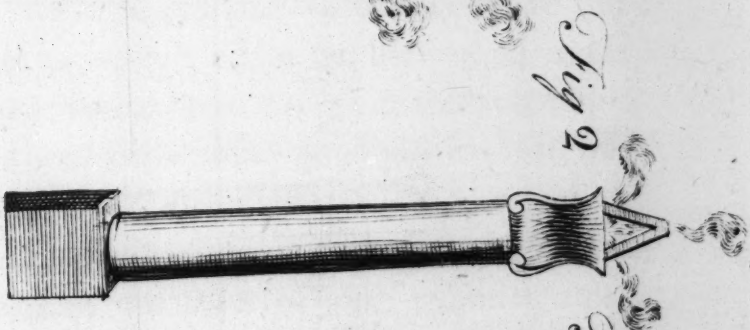
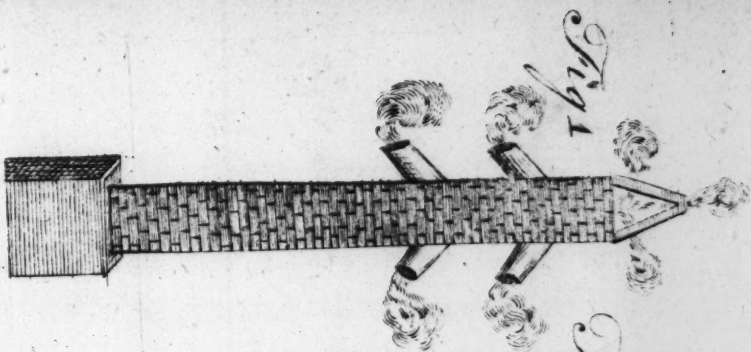
leaving

leaving only one port open, and the hole at the top to throw out the Smoke, which is sufficient if there be no stifling in the Vent, but a flan on the top; observing always to place the broad side of the flags to the flan. This Machine is very easily performed, and is chiefly intended for Vents that are carried up to right proportions which do not cause stifling, tho' perhaps the situation of the building may make it liable to be troubled with a flan of wind on the top sometimes. And I would advise those who have buildings with their Vents regularly carried up, tho' sometimes troubled with a flan on the top, to make trial of this before they put themselves to any further charges; as this may be done at an easy rate, and generally proves an effectual cure.

EXPLANATION. PLATE IV. FIG. 5.

Draw the line AB representing the cope or head of the Vent; the lines AC and BD shew the two flags set on edge; and the line CefD shews the flag that covers the other two flags; and ef shews the hole in the top always open.

MA-



Plat III.



Plate IV

Fig 5

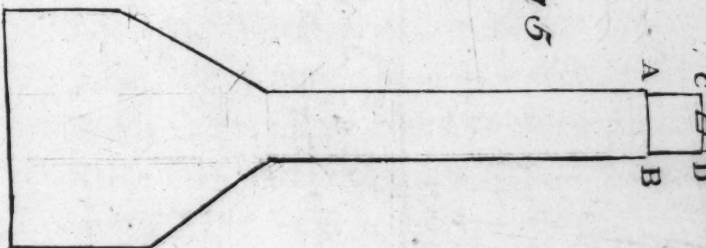


Fig 4

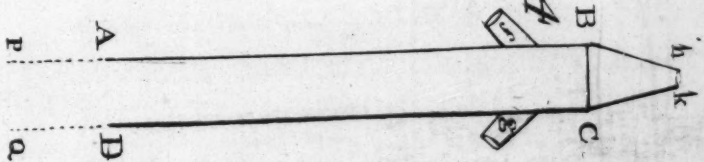


Fig 3



Fig 2

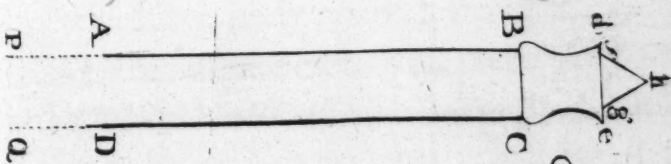
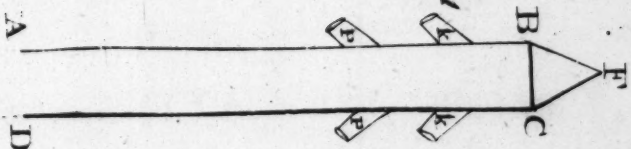


Fig 1





MACHINE XI. PLATE V. FIG. I.

The DESCRIPTION.

This Machine must be made of white iron, and the main body round; make the main body about 5 feet high before you place your head-piece, and the wideness of the main body proportioned to your Vent where you fix it, and 1 foot square to go down the Vent. The shape of the main body, as shewn in the figure, has two curves; one of them turning aside from the mouth of the Vent, and the other returning back and going upwards. Make the top-piece 18 inches above the main body to its top-cover; and the top-cover 6 inches high, and as wide as the main body: The rounding of the top-piece on each side to come down below the top of the main body 9 or 10 inches, and at 6 inches distance off from the main body with 3 upright supporters from the main body, and fixed within the head-piece to bear it up. Likeways you must make an hole 4 inches square in the square cover at the top of the head-piece, always open to sweep the Vent. This Machine is best placed at either end of a Chimney head, or where there is a distance between the bridges to allow room to turn the Machine on each side, and is of great service where the draught within the Vent is short.

EX-

EXPLANATION. PLATE VI. FIG. 1.

Draw the two curved lines AB and CD parallel to each other, and representing the main body; the prickt line BC is the top of the main body; the two arches *ef* and *gb* represent the outward sides of the head-piece; and the line *eb* shews the under part of the head-piece below the top of the main body; the three prickt lines *pq*, *st*, and *ro* shew the three supporters; the figure *fmnopng* shews the square cover on the top of the head-piece; and *op* shews the hole in the top of the square cover always open.

MACHINE XII. PLATE V. FIG. 2.

The DESCRIPTION.

This Machine may be placed where a Vent is carried up at the side of a turnpike or the front of any gentleman's building, or where the Vent is carried up by the gavel or side-wall so as to carry the Smoke away round the turnpike or gavel, &c. without being observed in the outer court or clofs. Likeways this Machine adds a good draught to the Vent, as is performed by us at his Majesty's Exchequer in the Parliament-clofs in *Edinburgh*,
upon

upon the south west corner on the east side of the turnpike there. If the turnpike or gavel be the back of the Vent, and its cope or top of the Vent no higher than the level of the ballustrade, and the Vent not going right; place this Machine with a square piece to go down the Vent 9 or 10 inches long: The wideness must be proportioned to the Vent you fix it on.

The main body is always round, and made of white or black iron. From the cope of the Vent, where you fix it, as shown in the figure, make it turn round all the way; the main body being an inch less diameter than where you fix it. And when you have it off from the view of the court, turn it up with a gradual turn before you place your head-piece. And likeways make an air-pipe to blow, as shown in the figure, 2 feet and an half or 3 feet in length, and as wide as the main body; fixing it 4 feet above the cope of the Vent, and hanging down by the side of the main body to receive the Smoke that it may not return into the room again. Likeways, if the main body of this Machine goes any great length, observe to place an air-pipe at every 4 or 5 feet distance the main body contains in its length; making each air-pipe so placed 2 feet and half, or 3 feet in length, and near as wide as the main body. Whether you make this Machine of white or black iron, you must

must have holes cut in the plates at convenient places for sweeping the Vents; which holes must have lids or covers with iron bands and snecks to shut close and allow no air to come in.

The head-piece is the same as in Machine III. which may be either of wood or white iron; only this head-piece hath but 3 sides, the turnpike or gavel &c. being the fourth; whereas Machine III. its head-piece hath 4 sides. As to the height of the box, make it 3 feet, *viz.* one foot above the main body and two feet below the top of the main body. Likewise make it 8 inches on every side wider than the main body is at the top, that it may receive the Smoke to go downwards, because this box must be quite close above to prevent the flan, and open on every side below. This Machine must be fixed with iron batts to the turnpike or gavel, &c.

EXPLANATION. PLATE VI. FIG. 2.

Draw the two circular lines AEFB and CD representing the screwed part of the main body; from A draw the perpendicular line AM; and from D draw the other perpendicular line DN parallel to AM, representing the piece of the main body fixed at the cope; the prickt lines Mr and Ns shew the square-piece sunk into the cope
or

or mouth of the Vent 9 or 10 inches down. The figure *e F E f* describes the air-pipe, supposing there is only one air-pipe, but, if there be more, make them according to the foregoing Description, and at their proper distances: The figure *LGHK* describes the box clost at the top; and the prickt line *BC* shews the top of the main body within the box. The numerical figures 1, 2, 3 and 4, shew the holes, with lids and snecks to open for sweeping the Vents.

MACHINE XIII. PLATE V. FIG. 3.

THE DESCRIPTION.

The main body of this Machine is made of wood or white iron, or in brick-work, and its head-piece wood or white iron; the main body is commonly square, make it 3 or 4 feet high, or more as occasion requires.

This Machine must be fixed on a Vent, where its broad side is towards the suspected flan; make the wideness of the main body in proportion to the Vent upon which it is placed; the cross-piece of the head-piece must lie a-cross betwixt back and bosom of the Vent; and make it equal in wideness with the main body. The spouts on each side must

must have their outside at the same distance from the main body, that the main body is in wideness; and their inside must be 3 or 4 inches from the main body; that is to say, the two perpendicular spouts must be 3 or 4 inches narrower than the main body, having their outer side as far from the main body as it is in wideness. The upper and the under ends of each spout must be 18 inches in length above and below the cross-piece, all open; the top of the cross-piece is quite clos'd, with an hole in the middle, having a lid and iron bands to open for sweeping the vent: Also you must make two squinted holes, at least as far down in the main body as the under ends of the spouts reach, and about 4 inches in wideness, and the same in length.

EXPLANATION. PLATE VI. FIG. 3.

Draw the lines AB and CD, representing the main body; the line BC is the top of the main body; and the figures *e* and *f* shew the squinted holes in the main body; the lines SN and IK shew the length of the spouts; *rq* and *gb* shew the under part of the spouts, and *op* and *Lm* shew the upper part of the spouts. The figure T shews the lid on the top of the cross-piece, that opens to sweep the Vent.

M A.

MACHINE XIV. PLATE V. FIG. 4.

The DESCRIPTION.

This Machine is performed in brick-work, on the top of an upper story or garret of the Kitchen-vent; which, supposing it 12 inches square at the cope, where you begin your brick-work, and the Vent carried up perpendicular, which is many times the case with upper stories, and occasions them to be very much touched with flans; this Machine is an approved method for giving a quick draught to prevent the flan. As to the wideness of this Machine, whatever wideness you find your Vent, supposing it, as above, to be 12 inches at your founding your bricks, see that you have as much room on either of the two sides or back, as allow you to fly the breadth of your Vent, to the proportions directed in Part I. anent Kitchen-vents; before you fix your head-piece, always observe that the back of your Vent be either plumb or falling back, many having fallen into errors by not observing this.

As to its height, make it up 4 or 5 feet, or perhaps more, till you get a gradual turn, as shown in the figure, the prickt lines representing the plumb of the bricks on the corners. As to the head-piece, set three pan-tyles on end; and on the

E

side

side where the flue comes from the open port ; then make up a bridge of bricks opposite to the open port, and 8 inches high, at 6 inches distance from the open port, as shewn in the figure ; then cover it with a slate or thin flag, which will make two holes 6 inches wide, and 8 inches high, at each end of the open port, to allow the Smoke to get out.

Next you must place 2 or 3 bricks on the top of the flag or slate, to make it up to the level of the pan-tile ; then cover the tops of the pan-tyles with a thin flag, making a small hole in the middle of the flag, to allow the Vent to be swept : Observe likewise to leave the other two ports of the pan-tyles pretty open, to allow the Smoke to get out ; likewise you must make two squinted holes on each side of the main body, about 6 inches square in wideness ; the upper two squinted holes must be 1 foot below the tyles, and the undermost two squinted holes must be 1 foot below the upper ones.

EXPLANATION. PLATE VI. FIG. 4.

Draw the two prickt lines AB and CD, representing the plumb of the bricks ; draw the two lines *ab* and *cd*, representing the body of the Vent, then *bc* is the top of the Vent, and *ef* shew the squinted holes in the body of the Vent ; the figure

figure *bb T kc* shews the two pan-tyles opposite to each other; and *kc* shews the pan-tyles opposite to the open port; and *T* shews the hole in the middle of the flag, that covers the pan-tyle, to allow the Vent to be swept; *no* is the bridge of bricks 8 inches high; and *op* is the slate that covers the bridge, 6 inches in length: Likewise the figure *n o p b* shews the two holes, one at each end of the open port, and opposite to one another, 8 inches high, and 6 inches wide.

MACHINE XV. PLATE V. FIG. 5.

THE DESCRIPTION.

This Machine is done in brick-work, and is the same as to its design as Machine XIV.; it differs only in places where there is room to place two open ports with two pan-tyles only, set on edge opposite to each other, and open holes at each side of each open port, as shown in the figure; or upon a small Vent, where its bounding to turn it does not require so much room; therefore we refer you to Machine XIV. for the description. But you must observe, that this Machine, as well as the foregoing, will not answer upon any Vent, unless you have room on the top of the Vent to work upon, or curvel out your building;
if

if the owner will allow it. The body of this Machine may be carried up to 4 or 5 feet high, or more perhaps, if need require, till you get a gradual turn away from the old Vent, which, in this case, is supposed to be too perpendicular or straight built up.

EXPLANATION. PLATE VI. FIG. 5.

The explanation of this Machine is the same with the foregoing, only there are but two pantyles set opposite each to other, and two open ports, with an hole at each side of each of the two open ports, which holes are made by the bridges of bricks opposite to each open port, and the flag cover above each bridge, as shown in the figure, and demonstrated in the Explanation of Machine XIV.

MACHINE XVI. PLATE VII. FIG. I.

The DESCRIPTION.

This Machine is round, and made of white iron; the main body must be 3 or 4 feet high, and its wideness proportioned to the Vent whereon it is fixed. You must make two holes 9 inches below the top of the main body, 4 or 5 inches diameter, and

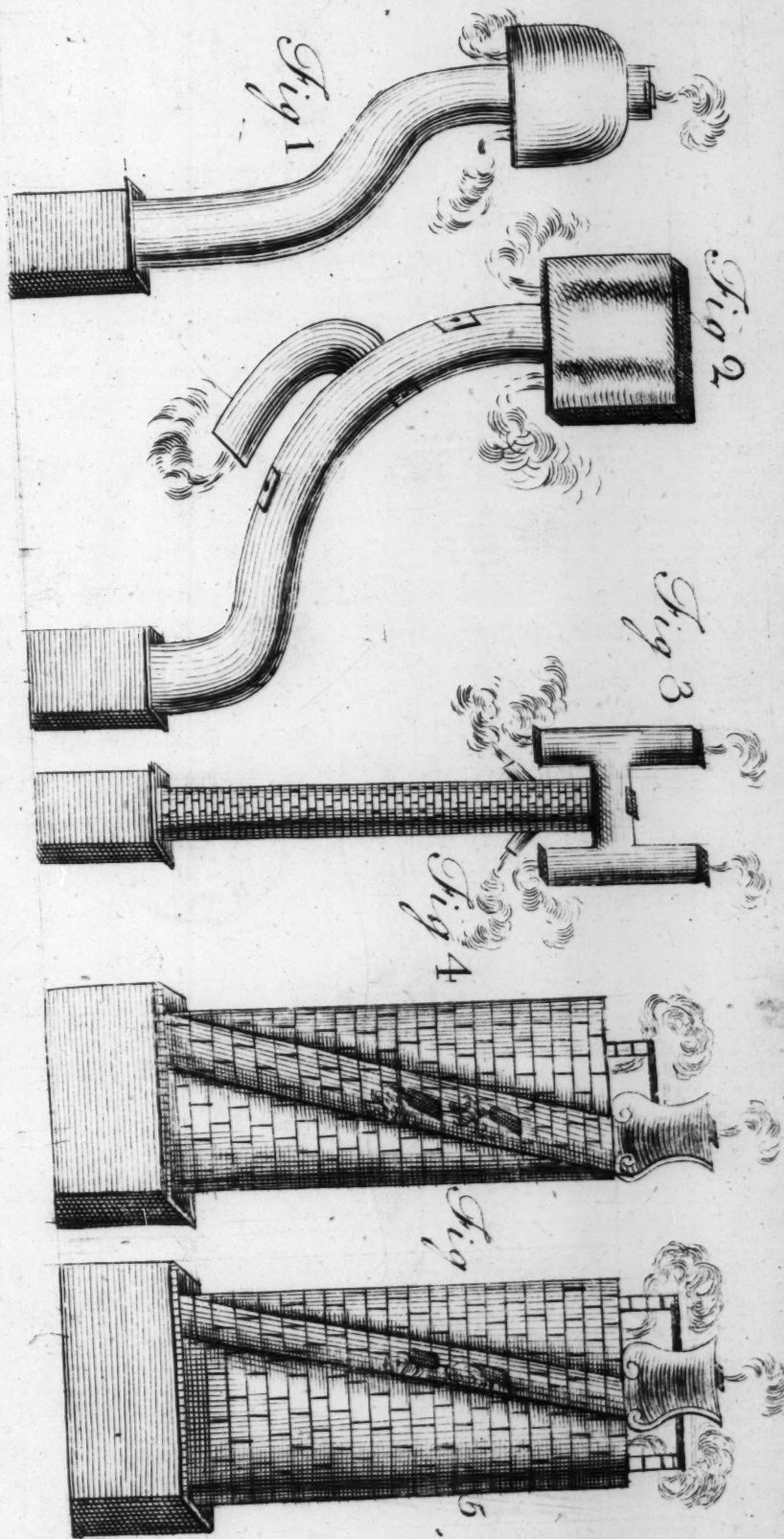
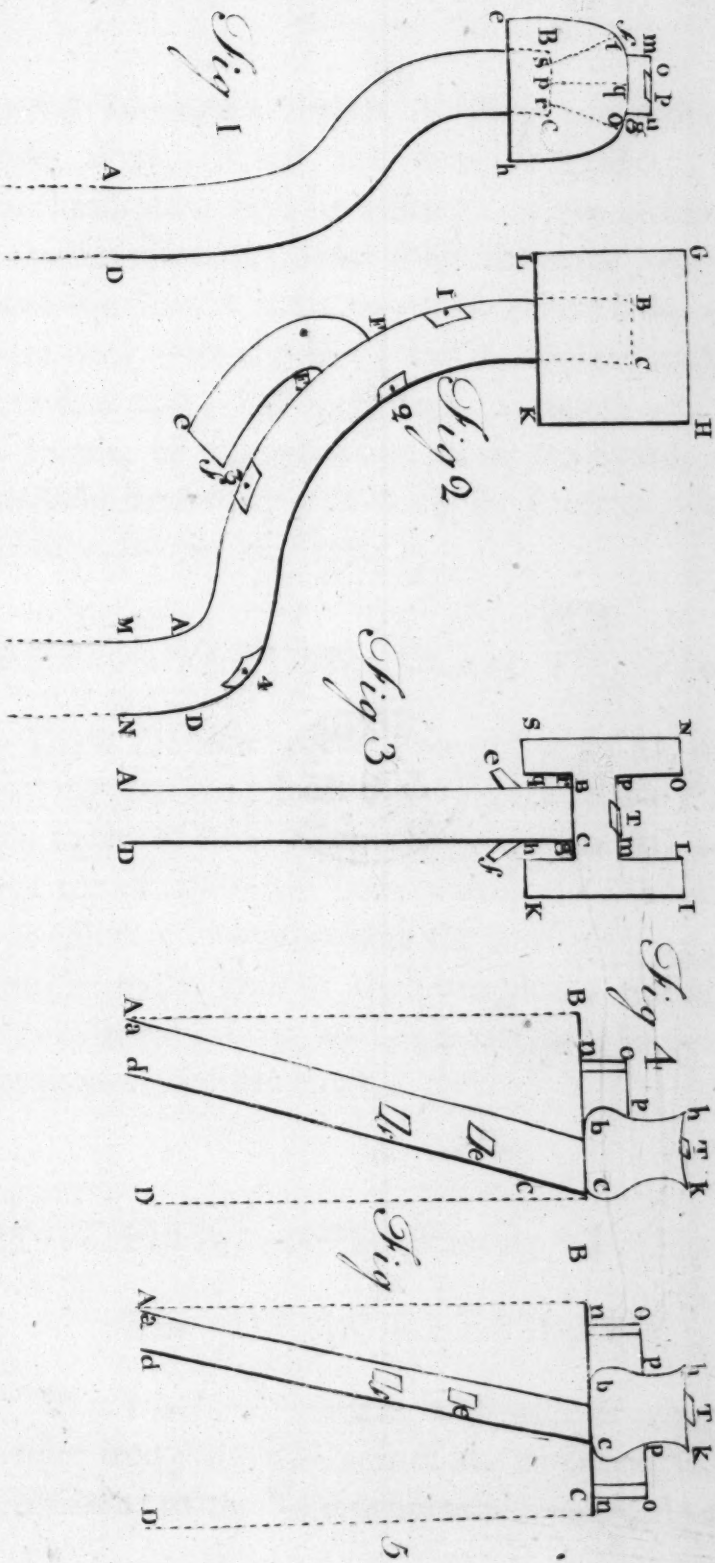


Plate V



Plate VI





and 6 inches in length, standing out from the main body, to rest the head-piece upon ; and the head-piece must be 3 inches on every side, or 6 inches diameter wider than the main body, to give the Smoke room to come downwards, when beat back with the fan ; the head-piece must be one foot and a half high from the props whereon it stands, of a round form, as in the figure, with an hole in the top 5 or 6 inches diàmeter, always open to sweep the Vent.

EXPLANATION. PLATE VIII. FIG. I.

Draw the two parallel lines AB and CD, representing the main body ; the figures *e* and *f* shew the squinted holes ; and the prickt line BC shews the top of the main body within the head-piece ; the figure *g i k b* represents the head-piece ; *g* and *b* are the under ends of the head-piece, resting on the squinted holes ; and *i k* is the hole in the top, open to sweep the Vent.

MACHINE XVII. PLATE VII. FIG. 2.

The DESCRIPTION.

This Machine is square, and made of wood or white iron ; the wideness of the main body is proportioned to the Vent whereon it is placed ; make the

the main body about 3 or 4 feet high ; likewise make the head-piece one foot above the main body, and the length of its sides one foot and 9 inches, with two upright supporters from the main body, and two curved holes on two of the sides where the flan is least suspected ; likewise make a small hole in the top, 4 inches diameter, always open to sweep the Vent.

Make the sides of the head-piece stand out 6 or 7 inches from the main body, as shown in the figure. This Machine is beneficial to cure a flan, where the Vent has a good draught of itself, but touched sometimes with the flan in high winds.

EXPLANATION. PLATE VIII. FIG. 2.

Draw the two lines AB and CD, representing the main body, BC is the top of the main body ; the figure *giTkb* represents the head-piece ; *gi* and *kb* are the two sides of the head piece ; and T is the hole left open to sweep the Vent ; Br and SC shew the two upright supporters within the head-piece ; and the figure H shews the two curved holes opposite to each other.

M A-

MACHINE XVIII. PLATE VII. FIG. 3.

The DESCRIPTION.

This Machine is made square in brick-work. Make the main body 3 or 4 feet high, or more, according as the Mechanic sees proper, to bring the Vent to a right proportion, before he place the head-piece upon it. And, if there be room on any side to fly backward, on either of the two haunches, or the back of the Vent, but not the bosom, if it be upon the garret or upper stories, it will give a smarter draught.

As to the head-piece, in placing the bricks, you must lay them squint ways on each corner of the Vent, 3 or 4 bricks high, or more, as occasion serves, with a flag cover on the top, and an hole in the middle of the flag 3 inches square, always open to sweep the Vent.

EXPLANATION. PLATE VIII. FIG. 3.

Draw the two lines AB and CD, representing the main body of the Machine; BC is the top of the main body; the figures *dB*, *eC*, *fg*, *hi*, *km*, and *no*, shew the bricks placed squinted ways on the corners of the Vent. The line *pTq* shews the

the flag cover on the tops of the bricks ; and T shews the open hole in the middle of the flag.

MACHINE XIX. PLATE VII. FIG. 4.

The DESCRIPTION.

This Machine is made square, and of wood or white iron. The main body is 3 or 4 feet high, and proportioned in wideness to the Vent whereon it is fixed. The head-piece is in height 2 feet 9 inches in whole, *viz.* one foot below the top of the main body, the height of the cross part of the head-piece, one above the top of the main body, and the squinted broads, 9 inches high, and open on two sides. The distance or wideness of the head-piece from the main body is 9 inches on each side. Likewise the head-piece is closd above the cross-part of the head-piece, betwixt the two squinted broads, having an hole with a lid and iron bands to lift up, to allow the Vent to be swept.

EXPLANATION. PLATE VIII. FIG. 4.

Draw the two parallel lines AB and CD, representing the main body ; then BC is the top of the main body, within the head-piece. The lines *eg* and *fb* represent the height of the head-piece ;
The

The distances *BI* and *Ck*, shew the height of the cross-part of the head-piece above the top of the main body. The lines *Ig* and *kf* represent the squinted broads; the line *iLk* shews the top of the cross-piece; and the figure *L* shews the lid that opens.

MACHINE XX. PLATE VII. FIG 5.

The DESCRIPTION.

This Machine is square, and made of wood or white iron; the wideness of its main body is proportioned to the Vent it is placed upon. Make the main body 3 or 4 feet high. Make the head-piece 2 feet and an half high, *viz.* one foot above the main body, with two stroups hanging downward by the side of the main body, one foot and an half in length, and each division or stroup 9 inches wide. This head-piece is quite clos above, having a square hole in the top 6 or 7 inches wide, directly above the top of the main body, with a lid and iron bands, to open when the Vent is to be swept, always taking care to place the stroups on the opposite side to that where the flan touches most.

This Machine will not answer, where the mouths of the stroups hang over the neighbouring Vents;
F
because

because the Smoke in the neighbouring Vents is hurtful, even when there is no fire in the Chimney below the Vent whereon this Machine is placed.

EXPLANATION. PLATE VIII. FIG. 5.

Draw the lines AB and CD, representing the main body of this Machine; then BC is the top of the main body. BF shews the height of the head-piece above the top of the main body; FG shews the wideness of the head-piece; and T shews the lid to lift up with iron bands for sweeping the Vent: GH shews the height or depth of the whole head-piece; CL and KI shew the depth of the two stroups that hang down by the side of the main body; and LI and IH shew the wideness of these stroups.

MACHINE XXI. PLATE VII. FIG. 6.

The DESCRIPTION.

This Machine may be performed either in white iron or wire, and is made either round or square, having no head-piece, but quite open at the top: The wideness of this Machine is proportioned to the wideness of the Vent you fix it upon. You may make this Machine 2 feet or 2 feet and an half

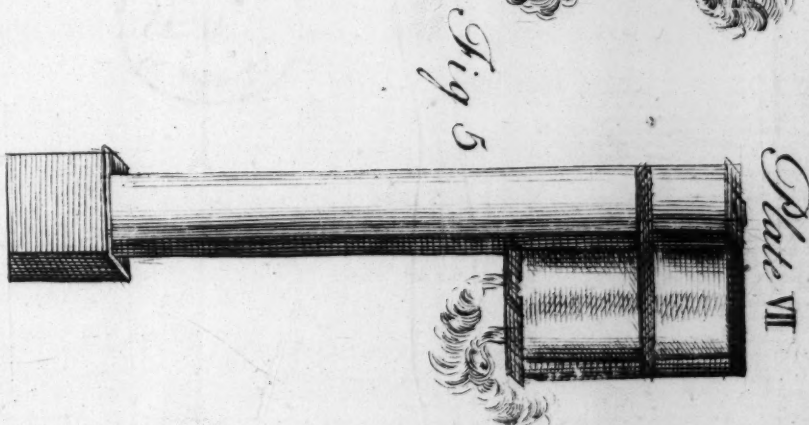
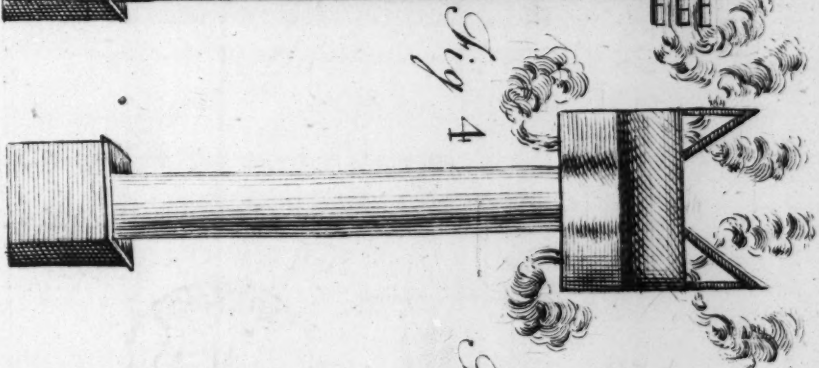
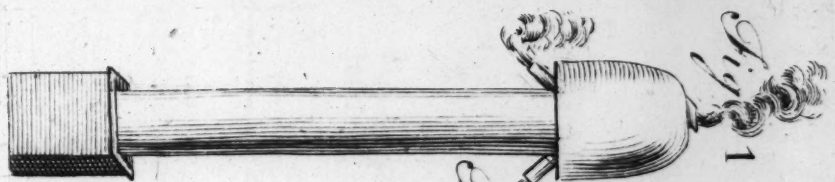
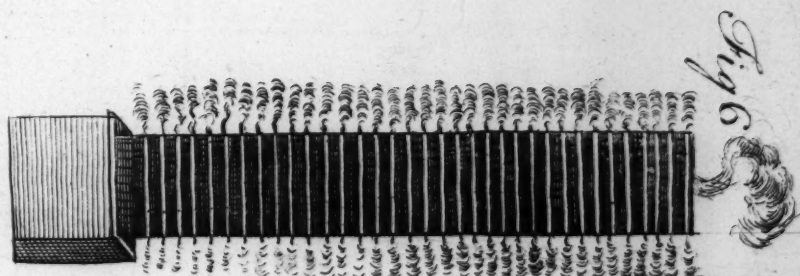


Plate VII





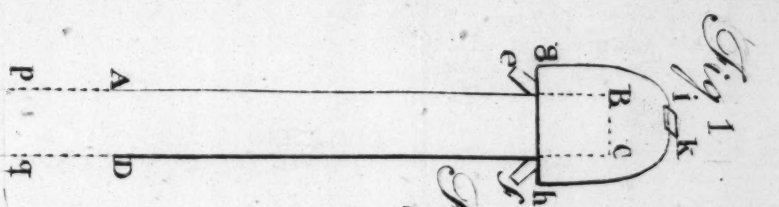


Fig 1

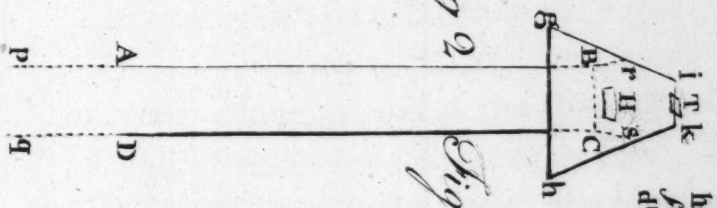


Fig 2

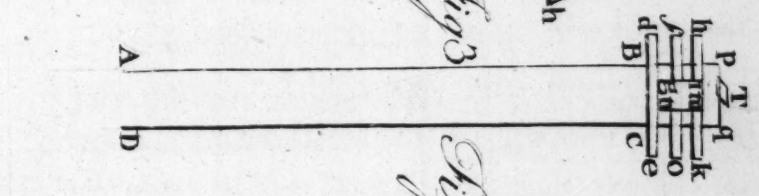


Fig 3

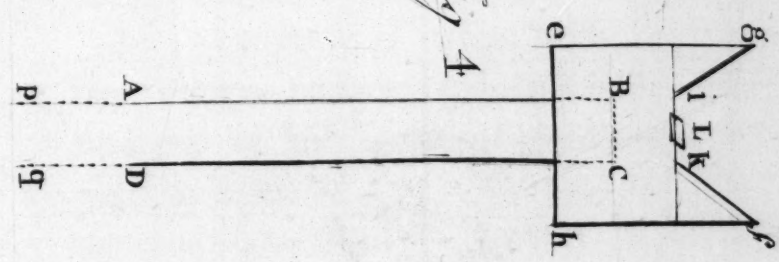


Fig 4

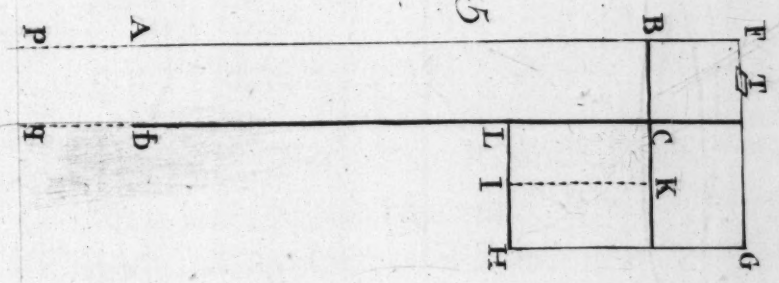


Fig 5

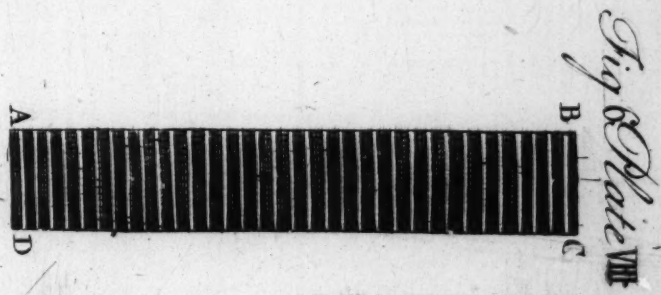


Fig 6 Plate VIII



half high, or more, if upon upper stories or garret Vents.

If you make this Machine of wire, you must plait or twist two wires together, and place them in rows, allowing always the thickness or breadth of one wire open betwixt each row, continuing so to do till you make your Machine the height you desire. Likeways you must fix your wire upon a frame of wood to go down the Vent the deepness of the cope.

If you make it of white iron, let your white iron bridges be twice as broad as the distance or wideness of the opens or vacancies ; that is, if your bridges be one inch deep, let the open or vacancy betwixt two bridges be half an inch wide, always leaving as much of the plate whole at the under part of the Machine as fix it in the cope of the Vent.

EXPLANATION. PLATE VIII. FIG. 6.

Draw the parallel lines AB and CD representing the main body of this Machine. The lines a-croß the body, and parallel to BC the top of the body, and also parallel to AD the basis or cope of the Vent, shew the rows of wires or bridges of white iron.

C O N.

C O N C L U S I O N.

NOW having shewn you various kinds of Machines for preventing or curing Smoke; and as the causes of Smoke are various and differing from one another according to the different situations of buildings in this city, and the various situations even of buildings that stand alone in the country, which causeth that the same Machine which will cure one Vent will not cure another; likewise it may occur that the suction of air below, as well as the situation of the Vent at the top may cause Smoke: We shall therefore give some general directions whereby to try Vents, and for the right management of your Machines.

The surest way to try any Vent (besides that of the common use of fire in a moderate degree) is, to try how the Vent goes with a great fire, not of live-coals, but rather the fire dark with Smoke, or as smoaky as possible, and at a time when you find the fan of wind strongest which usually affected your Vent.

Whether

Whether you make your Machine of wood, white iron or brick-work, let it be proportioned to the mouth or cope of the Vent whereon you fix it; and if upon an old building where the Vents are commonly wide, bring it gradually in to the proportions described in Part I. till you come to the top of the main body where you are to place your head-piece.

If your Machine be round, make it at least 2 or 3 inches diameter wider than the square of the mouth of your Vent where you place the Machine: Only observe, that what you place within the Vent, which is usually 9 or 10 inches deep, must be square, to fix the Machine in the mouth of the Vent.

If a round Machine be proportioned exactly to the wideness of the mouth of the Vent whereon it is placed, it causeth a stifling, especially if the room be clos'd below; therefore, as above directed, let its diameter be 2 or 3, or perhaps 4 inches wider than the cope.

When you fix any Machine upon the top of any Vent, be sure to place its weather side or clos'd side towards that quarter from whence the flue comes that causeth the Vent to smoke; that is, if it be a Machine with a fixed head-piece. But if the Machine has a moving head-piece, you must
only

only notice to place your squinted holes in the main body so as to answer the fan.

Machine XXI. has its grates or branders facing all quarters and all weathers, therefore its position is an exception to these general rules; as likewise some other Machines, having round head-pieces, are more or less distant from the main body all around, according as the nature of the Machine requires.

F I N I S.



